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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,621	07/31/2002	Kishore Acharya	121895	8846
23413	7590	10/17/2003	EXAMINER	
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			HO, ALLEN C	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 10/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/064,621	ACHARYA ET AL.	
	Examiner	Art Unit	
	Allen C. Ho	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 September 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>0902</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 400 (paragraph [0024], line 16). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 300. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. Fig. 3 is objected to because the numerals 140 and 80 cause confusions; they should be replaced by 140 KV and 80 KV, respectively. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities:

- (1) Paragraph [0015], line 8, "16" should be replaced by --14--.
- (2) Paragraph [0024], line 5, --414-- should be inserted after "data".
- (3) Paragraph [0024], line 14, "406 412 418" should be replaced by --406, 412, 418--.

Appropriate correction is required.

5. The applicant filed a preliminary amendment on 23 September 2002 replacing paragraphs [0028] and [0029] with new paragraphs. However, these new paragraphs already exist as paragraphs [0024] and [0025]. Therefore, the old paragraphs should be reinstated.

Claim Objections

6. Claims 27 and 29 are objected to because of the following informalities: Line 4, "for" should be replaced by --comprising the steps of--. Otherwise, the method steps could be construed as intended use. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 20-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20 claims both an apparatus and the method steps of using the apparatus, and is indefinite under 35 U.S.C. 112, second paragraph. *In re Ex parte Lyell*, 17 USPQ2d 1548 (Bd. Pat. App. & Inter. 1990). MPEP § 2173.05 (p).

9. The term "same geographic location" in claim 23 is a relative term which renders the claim indefinite. The term "same geographic location" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

10. The term "different geographic locations" in claim 24 is a relative term which renders the claim indefinite. The term "different geographic locations" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

The specification fails to define what is meant by "same geographic location" and "different geographical locations". If the imaging system and the processing device are located in different rooms in the same building, are they located in the same geographical location or different geographical locations?

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa *et al.* (U. S. Patent No. 6,278,760 B1) in view of Tsutshi *et al.* (U. S. Patent No. 5,396,530) and Merickel *et al.* (U. S. Patent No. 4,945,478).

With regard to claim 1, Ogawa *et al.* disclosed a method comprising: obtaining a first set of image data created in response to a first x-ray energy level (column 6, lines 35-39) and including a plurality of first pixel elements (inherent for a two-dimensional solid state detector of a cone-beam CT), wherein each of the first pixel elements corresponds to a unique location in an object being scanned; obtaining a second set of image data created in response to a second x-ray energy level (column 6, lines 39-45) and including a plurality of second pixel elements, wherein each of the second pixel elements corresponds to one of the first pixel elements and wherein the second x-ray energy level is higher than the first x-ray energy level; and calculating (20) a third set of image data in response to the first set of image data and the second set of image data, wherein the calculating includes subtracting (21) each of the second pixel elements from the corresponding first pixel element.

However, Ogawa *et al.* failed to teach that this method is used for plaque characterization.

Tsutshi *et al.* taught that the method of energy subtraction can be used to separate materials of different composition such as a bone, a soft tissue, a blood vessel, or a calcified tissue (column 4, lines 56-63).

Furthermore, Merickel *et al.* taught that any diagnosis or evaluation of the physiological stage of the atherosclerosis would necessarily involve identification and characterization of the plaque (column 4, lines 16-27).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the method disclosed by Ogawa *et al.* for plaque characterization, since a person would be motivated to diagnose atherosclerosis using a noninvasive method that poses a least amount of risk to a patient.

With regard to claim 5, Ogawa *et al.* in combination with Tsutshi *et al.* and Merickel *et al.* disclosed the method of claim 1, wherein the object is a patient (column 7, lines 40-42).

13. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa *et al.* (U. S. Patent No. 6,278,760 B1), Tsutshi *et al.* (U. S. Patent No. 5,396,530), and Merickel *et al.* (U. S. Patent No. 4,945,478) as applied to claim 1 above, and further in view of Gordon *et al.* (U. S. Patent No. 5,661,774).

With regard to claims 2-4, Ogawa *et al.* in combination with Tsutshi *et al.* and Merickel *et al.* disclosed the method of claim 1.

However, Ogawa *et al.*, Tsutshi *et al.*, and Merickel *et al.* failed to teach or fairly suggest that each of the second pixel elements and each of the corresponding first pixel elements are created in less than one millisecond from each other within the same scan in an interleaving pattern.

Gordon *et al.* disclosed a dual-energy power supply that is capable of switching between a high-energy x-ray level and a low-energy x-ray level at a high modulation frequency up to 800 Hz, *i. e.*, the high-energy x-ray pulses and the low-energy x-ray pulses are separated by 0.625 ms (column 7, lines 12-32); the high-energy pixels and the low-energy pixels are acquired less than one millisecond from each other.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ the dual-energy power supply disclosed by Gordon *et al.* with a dual-energy cone-beam CT scanner, since a person would be motivated to acquire a high-energy image and a low-energy image as close to each other on the time scale as possible so that a clear subtraction image can be formed. In imaging a dynamic (time-dependent) object, a blurred subtraction image would result if the high-energy image and the low-energy image were sufficiently far apart on the time scale that they capture different motion states of the object.

14. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa *et al.* (U. S. Patent No. 6,278,760 B1), Tsutshi *et al.* (U. S. Patent No. 5,396,530), and Merickel *et al.* (U. S. Patent No. 4,945,478) as applied to claim 1 above.

With regard to claims 6 and 7, Ogawa *et al.* in combination with Tsutshi *et al.* and Merickel *et al.* disclosed the method of claim 1.

Although Ogawa *et al.* taught that the first x-ray energy level is 60 kV and the second x-ray energy level is 120 kV, they failed to teach or fairly suggest that the first x-ray energy level is 80 kV and the second x-ray energy level is 140 kV.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use 80 kV and 140 kV as the first x-ray energy level and the second x-ray energy level, respectively, since a person skilled in the art would recognize that this method would work for any two different x-ray energy levels.

15. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa *et al.* (U. S. Patent No. 6,278,760 B1), Tsutshi *et al.* (U. S. Patent No. 5,396,530), and Merickel *et al.* (U. S.

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Patent No. 4,945,478) as applied to claim 1 above, and further in view of Brown (U. S. Patent No. 5,459,769).

With regard to claim 8, Ogawa *et al.* in combination with Tsutshi *et al.* and Merickel *et al.* disclosed the method of claim 1.

However, Ogawa *et al.*, Tsutshi *et al.*, and Merickel *et al.* failed to teach or fairly suggest that the object being scanned was injected with a contrast agent.

Brown disclosed a method for monitoring a patient injected with a contrast agent.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to inject the object with a contrast agent, since a person would be motivated to distinguish the region of interest from surrounding tissues with a contrast agent so that the region of interest could be clearly identified.

16. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa *et al.* (U. S. Patent No. 6,278,760 B1), Tsutshi *et al.* (U. S. Patent No. 5,396,530), and Merickel *et al.* (U. S. Patent No. 4,945,478) as applied to claim 1 above.

With regard to claim 9, Ogawa *et al.* in combination with Tsutshi *et al.* and Merickel *et al.* disclosed the method of claim 1.

However, Ogawa *et al.*, Tsutshi *et al.*, and Merickel *et al.* failed to teach or fairly suggest displaying the first set of image data, the second set of image data, and the third set of image data.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to display all image data, since a person would be motivated to review all the images to obtain an understanding of the situation.

17. Claims 10, 12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa *et al.* (U. S. Patent No. 6,278,760 B1), Tsutshi *et al.* (U. S. Patent No. 5,396,530), and Merickel *et al.* (U. S. Patent No. 4,945,478) as applied to claim 1 above, and further in view of Keyes *et al.* (U. S. Patent No. 4,559,557).

With regard to claims 10, 12, and 14, Ogawa *et al.* in combination with Tsutshi *et al.* and Merickel *et al.* disclosed the method of claim 1, wherein the first set of image data, the second set of image data, and the third set of image data were created as non-contrast images.

However, Ogawa *et al.*, Tsutshi *et al.*, and Merickel *et al.* failed to teach or fairly suggest the method further comprising the steps of: obtaining a fourth set of image data created in response to the first x-ray energy level, wherein the fourth set of image data was created as a contrast image; obtaining a fifth set of image data created in response to the second x-ray energy level, wherein the fifth set of image data was created as a contrast image; calculating a sixth set of image data in response to the fourth set of image data and the fifth set of image data, wherein calculating the sixth set of image data includes subtracting the fifth set of image data from the fourth set of image data; calculating a seventh set of image data in response to the first set of image data and the fourth set of image data, wherein calculating the seventh set of image data includes subtracting the first set of image data from the fourth set of image data; calculating an eighth set of image data in response to the second set of image data and the fifth set of image data, wherein calculating the seventh set of image data includes subtracting the second set of image data from the fifth set of image data; and calculating a ninth set of image data in response to the third set of image data and the sixth set of image data, wherein calculating the ninth set of image data includes subtracting the third set of image data from the sixth set of image data.

Keyes *et al.* disclosed a method of hybrid subtraction for dual-energy x-ray, comprising the steps of: obtaining contrast images at low-energy (fourth set of image data) and high energy (fifth set of image data), and calculating a subtraction contrast image (sixth set of image data) in response to those contrast images (column 2, lines 62-68; column 3, lines 1-3); calculating subtraction images (seventh, eighth, and ninth) by subtracting non-contrast images (first, second, and third) from contrast images (fourth, fifth, and sixth) (column 3, lines 3-8). Keyes *et al.* taught that a major advantage of the hybrid subtraction technique is that it suppresses artifacts due to motions of the soft tissues (column 3, lines 8-12).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form hybrid subtractions, since a person would be motivated to obtain an image that clearly identifies the arteries that contain contrast medium without any artifacts due to motions of the soft tissues.

18. Claims 11, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa *et al.* (U. S. Patent No. 6,278,760 B1), Tsutshi *et al.* (U. S. Patent No. 5,396,530), Merickel *et al.* (U. S. Patent No. 4,945,478), and Keyes *et al.* (U. S. Patent No. 4,559,557) as applied to claims 10, 12, and 14 above.

With regard to claims 11, 13, and 15, Ogawa *et al.*, Tsutshi *et al.*, and Merickel *et al.* in combination with Keyes *et al.* disclosed the method of claims 10, 12, and 14.

However, Ogawa *et al.*, Tsutshi *et al.*, Merickel *et al.*, and Keyes *et al.* failed to teach or fairly suggest displaying the fourth set of image data, the fifth set of image data, the sixth set of image data, the seventh set of image data, the eighth set of image data, and the ninth set of image data.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to display all image data, since a person would be motivated to review all the images to obtain an understanding of the situation.

19. Claims 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa *et al.* (U. S. Patent No. 6,278,760 B1), Tsutshi *et al.* (U. S. Patent No. 5,396,530), and Merickel *et al.* (U. S. Patent No. 4,945,478) as applied to claim 1 above, and further in view of Brown (U. S. Patent No. 5,459,769).

With regard to claim 16, Ogawa *et al.* in combination with Tsutshi *et al.* and Merickel *et al.* disclosed the method of claim 1.

However, Ogawa *et al.*, Tsutshi *et al.*, and Merickel *et al.* failed to teach or fairly suggest the method further comprising the steps of: locating a vessel of interest in the object, wherein the object was injected with a contrast agent; tracking a flow of the contrast agent through the vessel; and quantifying plaque in the vessel in response to the third set of image data and to the flow.

Brown disclosed a method comprising the steps of: locating a vessel (106, 108) of interest in the object (column 4, lines 18-21), wherein the object was injected with a contrast agent (116); tracking (monitoring) a flow of the contrast agent through the vessel (120).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to perform the method steps disclosed by Brown, since a person would be motivated to acquire contrast images when the contrast agent has reached the vessel of interest.

Furthermore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to quantify plaque in the vessel in response to the third set of image data and to the flow, since a person would be motivated to perform data reduction to arrive at

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figures that would characterize the plaque so that the figures could be monitored and compared with future measurements in a consistent fashion.

20. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa *et al.* (U. S. Patent No. 6,278,760 B1), Tsutshi *et al.* (U. S. Patent No. 5,396,530), Merickel *et al.* (U. S. Patent No. 4,945,478), and Brown (U. S. Patent No. 5,459,769) as applied to claim 16 above.

With regard to claim 17, Ogawa *et al.* in combination with Tsutshi *et al.*, Merickel *et al.*, and Brown disclosed the method of claim 16.

However, Ogawa *et al.*, Tsutshi *et al.*, Merickel *et al.*, and Brown failed to teach or fairly suggest that tracking is performed in response to the second set of image data.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to track the flow of the contrast agent in response to the second set of image data, since a person would be motivated to track the contrast agent using either low-energy or high-energy x-rays depending on the x-ray absorption characteristics of the contrast agent.

21. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pflaum (U. S. Patent No. 6,324,254 B1).

With regard to claim 19, Pflaum disclosed a method for plaque characterization, the method comprising the steps of: obtaining image data created in response to an x-ray energy level and an object injected with a contrast agent (column 1, lines 16-21); locating a vessel of interest in the object (coronary arteries); tracking a flow of the contrast agent through the vessel (inherent); identifying soft plaque in the vessel in response to the image data and to the flow (column 2, lines 10-12).

However, Pflaum failed to teach or fairly suggest the steps of: plotting the distribution of the soft plaque; and determining the vulnerability of the soft plaque in response to the distribution.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to plot the distribution of the soft plaque, since a person would be motivated to determine the affected area and the extend of the problem.

Furthermore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to determine the vulnerability of the soft plaque in response to the distribution, since a person would be motivated to assign a risk factor in the diagnosis.

22. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa *et al.* (U. S. Patent No. 6,278,760 B1), Tsutshi *et al.* (U. S. Patent No. 5,396,530), and Merickel *et al.* (U. S. Patent No. 4,945,478) as applied to claim 1 above, and further in view of Takasawa (U. S. Patent No. 6,501,827 B1).

With regard to claim 27, Ogawa *et al.* in combination with Tsutshi *et al.* and Merickel *et al.* disclosed the method of claim 1.

However, Ogawa *et al.*, Tsutshi *et al.*, and Merickel *et al.* failed to teach or fairly suggest a computer program product for plaque characterization in cardiac applications, the product comprising: a storage medium readable by a processing circuit and storing instructions for execution by the processing circuit comprising the steps as claimed in claim 1.

Takasawa taught storing instructions on a storage medium readable and executable by a processing circuit (column 5, lines 25-33).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a storage medium storing instructions comprising the method steps, since a person would be motivated to program a processing circuit (controller) of an x-ray imaging system to perform the method steps.

In considering claim 27, the examiner noted: "a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory." MPEP § 2106.

23. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa *et al.* (U. S. Patent No. 6,278,760 B1), Tsutshi *et al.* (U. S. Patent No. 5,396,530), Merickel *et al.* (U. S. Patent No. 4,945,478), and Takasawa (U. S. Patent No. 6,501,827 B1) as applied to claim 27 above, and further in view of Gordon *et al.* (U. S. Patent No. 5,661,774).

With regard to claim 28, Ogawa *et al.*, Tsutshi *et al.*, Merickel *et al.*, Takasawa, and Gordon *et al.* disclosed the computer program product of claim 27.

However, Ogawa *et al.*, Tsutshi *et al.*, Merickel *et al.*, Takasawa, and Gordon *et al.* failed to teach or fairly suggest that each of the second pixel elements and the corresponding first pixel elements are created with the same scan in an interleaving pattern.

Gordon *et al.* disclosed a dual-energy power supply that is capable of switching between a high-energy x-ray level and a low-energy x-ray level at a high modulation frequency up to 800 Hz, *i. e.*, the high-energy x-ray pulses and the low-energy x-ray pulses are separated by 0.625 ms (column 7, lines 12-32); the high-energy pixels and the low-energy pixels are acquired less than one millisecond from each other.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ the dual-energy power supply disclosed by Gordon *et al.* with a dual-energy cone-beam CT scanner, since a person would be motivated to acquire a high-energy image and a low-energy image as close to each other as possible so that a clear subtraction image can be formed. In imaging a dynamic (time-dependent) object, a blurred subtraction image would result if the high-energy image and the low-energy image were far apart on the time scale that they capture different motion states of the object.

24. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pflaum (U. S. Patent No. 6,324,254 B1) as applied to claim 19 above, and further in view of Takasawa (U. S. Patent No. 6,501,827 B1).

With regard to claim 29, Pflaum disclosed the method for plaque characterization of claim 19.

However, Pflaum failed to teach or fairly suggest a computer program product for plaque characterization in cardiac applications, the product comprising: a storage medium readable by a processing circuit and storing instructions for execution by the processing circuit comprising the steps as claimed in claim 19.

Takasawa taught storing instructions on a storage medium readable and executable by a processing circuit (column 5, lines 25-33).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a storage medium storing instructions comprising the method steps, since a person would be motivated to program a processing circuit (control unit) of an x-ray imaging system to perform the method steps.

In considering claim 29, the examiner noted: "a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory." MPEP § 2106.

Conclusion

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- (1) Milnes (U. S. Patent No. 6,463,121 B1) disclosed an interactive x-ray position and exposure control that automatically tracks a contrast agent injected into a body.
- (2) Gelman (U. S. Patent No. 6,337,992 B1) disclosed a method for tracking a contrast medium.
- (3) Pelc (U. S. Patent No. 5,485,492) disclosed a dual-energy CT scanner.
- (4) Macovski (U. S. Patent No. 4,662,379) disclosed a dual-energy coronary artery imaging system.
- (5) Brody (U. S. Patent No. 4,611,341) disclosed a dual-energy x-ray subtraction imaging system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (703) 308-6189. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (703) 308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.



Allen C. Ho
Patent Examiner
Art Unit 2882

ACH